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HISTORY OF CULTIVATORS

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"The original cultivator was, like the original plow, simply a hooked stick. This in time was developed into the hoe, and remained the common cultivating implement until this century (19th) was well advanced." (5p. 354) 1/

It is stated in the 1860 Census, (9, p.xxv) that "The first American patent for improvement in hoes was registered in 1819, and for cast steel hoes in 1827, by C. Bulkley, of Colchester, Connecticut, but cast steel hoes were made in Philadelphia by at least two manufacturers in 1823." Mention is also made by the same authority of the manufacture of "scythes, sickles, hoes, shovels, and other hardware in considerable amount previous to 1803," in Pittsburgh, Pennsylvania. It is also stated that "on account of the fall in the price of iron and steel, superior steel hoes were made in Pittsburgh in 1831 for about \$4.50 per dozen, or one-half the price of iron hoes ten years before." The demand for hoes seems to have increased prior to the invention of the cultivator, as it is also stated that 1,600 dozen steel hoes were manufactured in two establishments in Pittsburgh in 1836, and that 32,000 dozen of hoes and 11,000 dozen of planters' hoes were made in four establishments in the same city in 1857.

As late as the first decade of the 19th century not only was the hoe used in the cultivation of row crops, but in some sections of the South, notably the lower parts of South Carolina, according to Leo Rogin, (8, p.53) "The hoe was the principal instrument of husbandry, being employed almost to the exclusion of the plow for Indian corn and cotton." Rogin quotes the English traveler, Olmstead, as saying, referring to the coastal regions of the Carolinas and Georgia, "As late as 1853" ***** "the clumsy iron hoe is almost everywhere made to do the work of pick, spade, shovel and plow. I have seen it used to dig a grave. On many plantations a plow has never been used; the land being entirely prepared for the crop by chopping with the hoe." Another writer about a decade later stated that on the coast of South Carolina the cultivation of corn was still carried on entirely with hoes.

Cultivating a considerable acreage with a hoe was a very tedious process, and inventors used their knowledge and skill in attempting to devise a machine that would more quickly and easily accomplish the desired result. One writer has said that "Next to the plow in importance to the farmer is, undoubtedly,

1/ Underlined numbers in parenthesis refer to the list of references on page 9.

the cultivator, an implement that has taken the place of the old-fashioned hand-hoe in the cultivation of such plants as are grown in rows. By the use of this implement a man with a span of horses is able to do the work of 10 or 15 men operating with the hand-hoe, especially in the cultivation of maize or Indian corn." (11)

It appears that a form of cultivator was used in England before they were introduced in the United States, as will be seen by the following quotation from the report cited just above. "Cultivators or horse-hoes, as they were called by English farmers, were in use in England in the very beginning of the eighteenth century. They were used in the cultivation of various kinds of crops planted in rows or drills, especially the small cereals, as wheat, barley, and oats, leguminous plants and succulent roots. These being planted or sown in drills, at equal distances from 6 to 12 inches apart, by the use of this machine a number of rows could be cultivated at a time by having a share so adjusted as to fit the interval between the rows. The horse-hoe of that period possessed all the essential elements of the straddle-row cultivator of this day and country, and the changes it has undergone on this side of the Atlantic have simply adapted it to the cultivation of maize or Indian corn." (11, p.397)

There seems to be some disagreement among writers as to the first inventor of a cultivator, as will be seen by the two following statements:

"Wilkie, of Scotland, is the inventor of the cultivator. In 1820 he invented the plurality of shares, the expanding frame and the caster wheel" (3, p.3).

"Jethro Tull, an English farmer who flourished in the early part of the last (18th) century, may justly be called the pioneer in the construction and use of this class of implements." (11, pp.397-398) The same author continues as follows:

"The following extract from the Complete Farmer, published in London, England, in 1807 will serve to give a very correct idea of the state of the art at the period referred to:

'Horse-Hoe, a very powerful tool of the hoe kind, which is much employed in the cultivation of crops that are sown or planted in the drill or row method, with sufficiently large intervals. These, like the hand sort, are of very different forms and constructions according to the uses for which they are designed; and likewise vary much in their weight and size, as well as the shape of the hoes or cutting parts. These sorts of hoes, from their executing the work, when constructed for the purpose, on a number of rows at the same time, have much superiority in point of dispatch, as well as in performing the operation to a greater depth and in a more perfect manner, over those of the hand kind. As by means of these hoes the mold can be more effectually stirred about the plants and the land kept more clear and free from weeds, they should be more constantly employed whenever the nature of the crop and the method in which it has been sown admit, as saving much labor and expense, as well as executing the business in a far more efficient manner.'

'We learn from the same work that even expanding horse-hoes were then in use, and in construction were adapted to work in drills of different widths,

that is to say, the bearing wheels were adjustable upon the axle in such a manner as to accommodate the space between the rows of various crops, as wheat, barley, beans, turnips, cabbage, etc. Drill machines, which have been long in use, were converted into horse-hoes by removing the drill teeth and substituting cultivating shares, and so adjusting them as to fit the spaces between the rows of growing plants. It was also discovered that soils of different textures will require to be hoed with shares of different form and size, and that nothing but experience in the field can point out that which is best adapted to any particular soil."

"The cultivator, introduced about 1820, had largely supplanted by 1840 the plow and the hand-hoe on eastern farms in working between the rows of corn. The new machines were cheap, costing only \$15. or \$20., and although clumsy and heavy according to modern standards they were much lighter than plows, and by doing away with hoeing, saved much hand labor. It was estimated in 1826, that more corn could be tilled in a given time with one cultivator than with three plows." (2, pp. 210-212)

The Report of the Commissioner of Agriculture for 1870, pp.398-399, contains the following quotation from Loudon's Encyclopedia of Agriculture, sixth edition, p.125:

"In England, from the Restoration to the middle of the eighteenth century, very little improvement took place, either in the cultivation of the soil or in the management of live stock. Even clover and turnips (the great support of the present improved system of agriculture) were confined to a few districts, and at the close of this period were scarcely cultivated at all by common farmers in the northern parts of the island. From the Whole Art of Husbandry, published by Mortimer in 1706, a work of considerable merit, it does not appear that any improvement was made on his practices till near the end of the last century. In those districts where clover and rye-grass were cultivated, they were cut green and used for soiling as at present. Turnips were sown broadcast, hand-hoed, and used for feeding sheep and cattle, as they were used in Houghton's time, and are still in most districts of England."

"In the beginning of the eighteenth century a considerable improvement in the process of culture was introduced by Jethro Tull, a cultivator of Berkshire, who began to drill wheat and other crops about the year 1701, and whose Horse-Hoeing Husbandry was published in 1731. ***** The extraordinary attention Tull gave to his mode of culture is, perhaps without a parallel. I was formerly at much pains, he says, and at some charge, in improving my drills for planting the rows at very near distances, and had brought them to such perfection that one horse would draw a drill with eleven shares, making the rows three inches and a half distant from one another, and at the same time sow in them three very different sorts of seeds, which did not mix, and these, too, at different depths.

"It will be seen by these quotations that the broad idea of cultivating more than one row of plants at a time by horse-power did not originate in this country. What, then, are the improvements in this implement claimed by American inventors? Perhaps the first and most important is the provision

of a driver's seat upon the frame of the machine, and the adaptation of the cultivating devices by which they were brought within the perfect control and guidance of the operator. Invention does not often make gigantic strides; and hence we see that little by little has been added to the original idea, and it is under this influence that farmers have reached the high standard now presented in cultivators.

"Thirty years ago, a man with a hand-hoe could, by the aid of a horse and plow, for plowing furrows between the rows of corn, cultivate an acre in a day. Now, with a span of horses, and one of our best riding cultivators, fifteen acres can be accomplished, and this with almost as much ease and comfort as a day's journey in a buggy.

"In looking back over the last thirty years, and tracing from year to year the improvements that have been made in this implement, to more perfectly adapt it to the cultivation of maize, or Indian corn, it would seem that this machine had almost reached perfection, and that there is little more that is desirable. Looking at the subject from another standpoint, however, we are forced to acknowledge that the field for advancement is constantly enlarging, and that every new improvement introduced only widens the area for others."

As corn planting was largely a hand operation in 1840, so also was cultivating that crop. "In 1840 corn in the East was cultivated with a hoe, or with an awkward and ineffective one-horse cultivator. The teeth, usually of cast iron, were fastened to the wooden frame with a short neck, rendering operation difficult on uneven land or where there were stumps and stones. The plow, for the cultivation of corn had gone out of use in the East. In the West the one-horse plow or the shovel plow were the implements commonly used for corn cultivation. Later, about 1850, another shovel had been added, and the double shovel plow became common. Three-shovel plows and steel-tooth cultivators were coming into use." (2, pp.302, 303)

By 1860 straddle-row cultivators of various types had appeared. The use of steel in the teeth greatly increased the efficiency of the implement. A great saving in man and horse labor was effected by the improvements in corn cultivators and planters in the years 1840 and 1860, and in addition there was a great improvement in the quality of work performed. The wheel cultivator was used in the wheat regions of western New York and eastern Ohio. It was considered of great utility in mellowing fallow land for wheat and destroying weeds. The machine had largely gone out of use by the late fifties." (2, pp. 302, 303) "In the West the amount of wheat which a farmer raised was determined by the acreage that he could effectively harvest. His corn crop was limited by the acreage that he could cultivate. Consequently, the introduction of reapers and cultivators was largely responsible for the rapid expansion of the area of production during this period. ***** In 1860 2-row corn planters and 2-horse corn cultivators were being rapidly developed. The single-shovel plow had given way to the double-shovel plow. ***** The Ohio farmer of 1860 who adopted the improved methods of production then available could probably produce his crops with two-thirds the labor required in 1840". The development of the 2-row riding cultivator followed the introduction of the 2-row, check-row corn planter. (2, p. 305)

"Various kinds of plows are in use for the cultivation of corn, single and double shovel, five tooth cultivators, 2-horse scrapers, and 2-horse, four-shovel plows. The scraper and 1-horse double-shovel plow are most in use." (7, p.64)

That many inventors were interested in the subject of cultivators is evidenced by the fact that of the 1,900 patents issued by the United States Patent Office in 1869, 150 were for cultivators. (10, p.315)

Carl R. Woodward (13, p.14) referring to cultivators in general, states that "The early reports of the United States Patent Office reveal some interesting facts about these machines. Some of them were equipped with wheels; others were without wheels, the weight of the machine resting upon the cultivator blades or plows. Some were equipped with a driver's seat; with others the operator walked behind."

Apparently the very first cultivators invented and used were not patented, as in (13, p.14) it is stated that "A hundred years ago in the tillage of corn on eastern farms the plow and the hand hoe were giving way to horse-drawn cultivators which had been introduced about 1820. These early 1-horse cultivators were much the same as the small cultivators of recent times, except that the A-shaped frame was of wood instead of iron, and certain devices for adjustment were lacking. Iron blades or teeth were fitted into the frame, and the implement was guided between the rows with a pair of handles similar to plow handles. For a number of years these cultivators occupied first place on New Jersey farms."

The first United States patent for a cultivator was issued to Borden in 1830, and the first wheel cultivator patent was granted in 1846. (3, p.3) This reference continues as follows: "The single shovel plow has been in use for many years; the double shovel is a later invention; it resembles some of the plows used for a thousand years or more in Asia and southern Europe. The double shovel is nearly perfect for the purpose for which it is used, viz: that of tending a crop which is planted in hills, such as corn or potatoes. The nearest approach to the American shovel plow is the Scotch horse hoe. The Scotch grubber is a heavy cultivator, drawn by four horses, and supported on wheels, for stirring and loosening the soil to plow depth. Cultivators are classed in the United States as ordinary, wheeled, rotary, straddle-row, parallel, disk, walking, riding, vineyard and expanding."

A patent was taken out in April, 1856, by George Esterly, of Wisconsin, the inventor of the grain header, according to Ardrey, (1, p.36) for a sulky cultivator having the shovels in separate gangs. The Esterly cultivator is referred to as a "curiosity in the cultivator line. ***** Mr. Esterly dwelt largely upon the advantage afforded by his machine in following the row, no matter how crooked, and regularly cleaning and cultivating both sides of it as the operator passed along." (6, p.22)

A patent was issued in 1856 to H.D. Ganse of New Jersey, covering a cultivator having foot control of the gangs. In January, 1857, J. Shaw, of Georgia, secured a patent for a cultivator "in which the hoes or shovels

had a swivel adjustment to throw the dirt to and from the plants." In April 1857, N. Whitehall, of Indiana, patented a cultivator having an arched axle over the row, and "which also had an evener suspended upon three points." A drag fender, or shield, attached to the gangs on each side, was covered in the patent of N. Fraser and A.J. McClellan," dated August 10, 1858. (1, p.36)

"Straddle-row, or 2-horse cultivators, were introduced between 1850 and 1860," ***** "One man with a 2-horse cultivator could do the work of two men with the old type of implement." The inventive minds of New Jersey about this time seem to have been focused on devising cultivators, or improvements on earlier models, as a number of patents were issued to citizens of that State, among which were the Smalley cultivator, patented in 1859, and the three so-called plows, known as the Rue, the Riggs and the Fisher. The Smalley machine "differed from others in the special combination of devices, particularly the placing of the seat so that the driver could raise and lower the cultivator teeth with a lever without dismounting." (13, p.14)

In the Fisher cultivator, patented in 1860, "the blades, which were in the form of small plows, were raised and lowered by means of a lever and chain attachment." In this cultivator the wheels were very high. Mr. Fisher improved his cultivator by providing a means for "widening or narrowing its main frame," a patent for which was issued in 1869. (13, p.14)

The Riggs plow, patented in 1861, "was not equipped with wheels, but consisted of two rows of plow-like blades fitted into an overhanging frame that straddled the row. It was operated by means of two handles extending to the rear. Riggs plows have been in use until fairly recent times, and may still be found on some farms." A patent for a furrowing sled, "typical of the implement in common use for corn planting the latter part of the nineteenth century" was issued to Mr. Riggs in 1864. (13, p.14)

The patent for James Rue's first cultivator was issued in 1859. That machine had neither wheels nor seat, and "adjustments were made by connections with the pole." A later patent, issued in 1872, covered a cultivator having a "heavy wooden frame and low wheels, the cultivator blades being raised and lowered by means of two levers. The pole was adjustable, and the driver walked behind, steering the machine by driving, and with the help of two horizontal handles." (13, p.14)

Another machine known as "Brown's cultivator, patented March 25, 1862, provided a gang of plows, attached to a mounted frame in such manner that the plows would rise and fall according to the inequalities of the surface of the ground. Their depth and distance apart also could be regulated." (13, p.14)

"A cultivator that anticipated the modern types of cultivators with flexible axles for steering, was patented by Edward Phifer, of New Jersey, June 30, 1868. The tongue, or pole, was pivoted on the frame to facilitate turning." (13, p.14)

Two patents were issued in 1873 to Oliver Kugler, covering cultivators, one of which is described as follows: "Concave scrapers are attached to runners, which converge in the rear. These are followed by shorter

scrapers or shares, which throw the clean soil toward the row of plants." The second patent is described thus: "A rectangular frame supported on runners, having inwardly projecting scraping wings on a rear cultivating attachment." Improvements were made and patented by Mr. Kugler in 1876. (14, p.14)

Other inventors of cultivators include James Dundas, of Illinois, who secured a patent in 1859, which was reissued in 1866, covering "six combination claims on the use of two wheels on a cultivator arranged with two gangs with a space between them, a seat for the driver, and means for moving the gangs laterally and raising the plows relatively to the treads of the wheels." (1, p.36)

B. Tinkham obtained a patent in 1860 in which he claimed "A beam hinged or pivoted to an axle by a joint, whereby the beams with their shovels had both a vertical and lateral swing in an upright position. It also claimed a rearward extension of the arched axle of the plow, with supports on it for holding up the gangs when not in operation." In 1862 L.B. Waterman, of Illinois, secured a patent "covering an adjustable seat." In 1863 J.A. Thorp and John Cox, of Michigan, obtained a patent on "the use of a yielding connection or wooden peg in the shank of the gang, so that the shovel might yield when it came against an obstruction that would otherwise break it." Another Illinois inventor was P. Coonrod, who in 1867 obtained a patent for "a coupling with a sleeve fitted on the axle." It is said that this "laid the foundation for the Brown and later patents using a sleeve or box." Three patents were issued to W.P. Brown, of Ohio. The one dated July 9, 1872, covered "spring arms and chains for suspending the weight of the shovel beams, substantially as and for the purposes described." The second patent was issued in 1877 "on a coupling and spring," and in 1879 another patent "covering details of what is known as the Brown coupling" was issued. (1, p.38)

In July, 1879, a patent was issued to G. Moore, of Illinois, "covering the use of a spring and coupling." ***** "In December, 1879, E.A. Wright, of Iowa, patented a peculiar spring, the principle of it being to exert a lifting strain on the gang after it has been raised above its operating position, and to bear down on it, rather than lift it, while it is in the ground." A second patent was issued to Mr. Wright, in 1881, "covering more fully the principle of his double acting spring." (1, p.38)

Many adaptations of the standard type of cultivator have been made by inventors, for corn cultivation and other uses. "Disks in place of shovels have been introduced ***** and meet with favor. Spring teeth ***** have also come into favor. ***** Within the past few years many styles of tongueless, walking cultivators have been put on the market by manufacturers, and have met with a favorable reception. They have the advantages of general convenience, light draft, flexibility in the frame so that the gangs can be held more steadily and nearer to the corn when it is small, and less room is required for turning at the side of the field." (1, pp.38-39)

Davidson and Chase, (4, p.91) state that "The modern cultivator, which is a very efficient aid to the cultivation of growing plants, has developed under the addition of animal power from a kind of crude hoe used in the early days. The original single shovel was changed for the double shovel, this in turn was supplanted by the straddle-row cultivator, and even the latter was increased in size until in some cases the modern cultivator will take two rows at a time. ***** Until 1860 country blacksmiths generally made the double shovels used by farmers."

Following the development of the general purpose tractor, about 1924, appeared tractor cultivators. These became available in 2, 3, and 4-row sizes

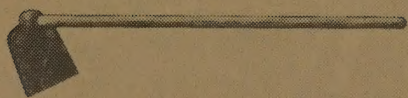
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FARM MACHINES, OLD AND NEW IN PICTURES:

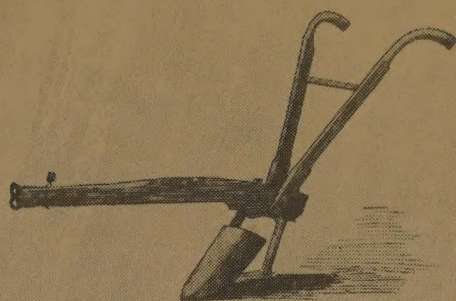
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FOR CULTIVATING ROW CROPS

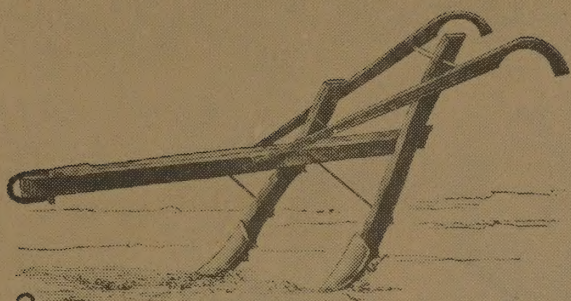
- Figure 1.- The hoe.
- Figure 2.- A shovel plow of a type found in this country early in the 19th century.
- Figure 3.- Double-shovel plow which came into use in the United States as early as 1850.
- Figure 4.- An early type one-row, walking cultivator with wheels.
- Figure 5.- A single-row riding cultivator appeared just prior to the Civil War.
- Figure 6.- A modern two-row, horse-drawn, riding cultivator made possible by the use of 2-row, check-row planters. The development of this cultivator began about 1860.
- Figure 7.- A two-row cultivator mounted on a modern general-purpose tractor.



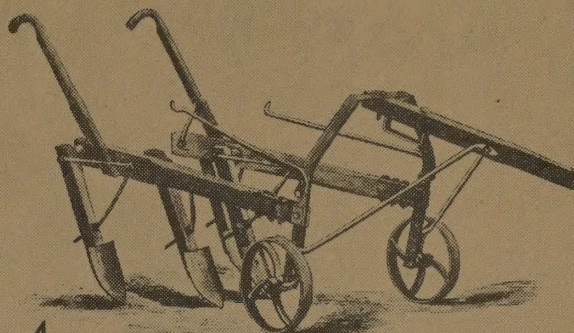
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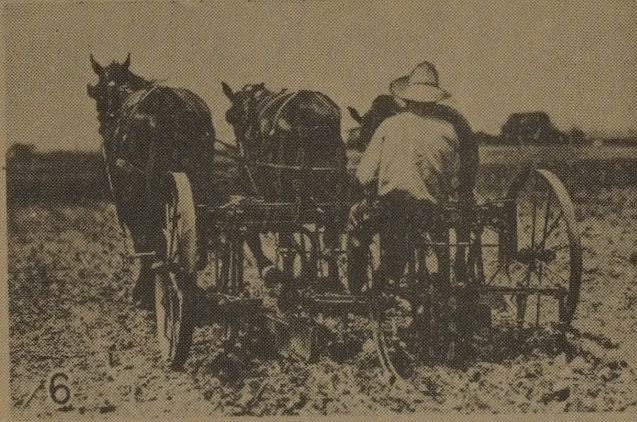
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